COMPLIMENTS OF
MONTREAL, OTTAWA &
GEORGIAN BAY CANAL CO.

The EDITH *and* LORNE PIERCE
COLLECTION *of* CANADIANA

Queen's University at Kingston

MONTREAL, OTTAWA

and

GEORGIAN BAY CANAL

Twenty Foot Navigation

From the Great Lakes to the Atlantic.

1—Description of Route.

2—Surveys.

3—Natural Advantages.

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1902

OTTAWA, April 1902

Preliminary work for location of the twentytwo-foot channel has now been completed.

Additional surveys, where required, have been made under the direction of Henry A. F. MacLeod, M. Inst. C. E.; assisted by Henry Carre, C. E. and H. G. Stanton. C. E.

All the recent surveys have been supervised and approved by George Y. Wisner, C. E. and the accompanying plan and profile have been prepared and the quantities taken out under his direction, and are approved by him as Consulting Engineer.

Quantities in detail, of excavations and constructions along the entire route have been taken out with great care by H. A. Purdon, M. Inst. C.E.

DESCRIPTION OF ROUTE.

The water surface of Georgian Bay at ordinary stage is about 564 feet above that of the St. Lawrence River at Montreal Harbor. It is proposed to raise and maintain the level of Lake Nipissing at an elevation of 66 feet above Georgian Bay, making the total fall from the Summit level of the waterway to Montreal Harbor 630 feet. The total lockage from Georgian Bay to Montreal will be 696 feet less the amount of slope of the river between the locks, which will likely be from 40 feet to 50 feet, making the aggregate of the lifts of all the locks about 650 feet.

The lifts of the locks as shown on the profile are for the total fall on the route, without regard to the slope, for the reason that the water surface of the river at times of floods will require a greater height of lock walls and gates than, for safe lockage, if no slope existed.

It is proposed to take care of the 66 foot rise from Georgian Bay to Lake Nipissing with three locks so arranged in connection with regulating dams in the French River that the level of Lake Nipissing may be maintained at a little above its mean stage. French River is a series of deep narrow lakes separated by rapids, at which points most of the fall from Lake to Bay is concentrated. The banks of the River are of gneiss rock and so high and steep that the levels of the different reaches may be regulated at almost any desired elevation without material damage to adjacent lands.

Lake Nipissing will constitute the source of water supply for lockage through the French River to Georgian Bay, and through the Summit level cut and the Mattawa River to the Ottawa. The Summit level will extend from Lock No. 3 on the French River through Lake Nipissing, Trout Lake, Turtle Lake and Talon Lake, to Lock No. 6 in the Canal around Talon and Paresseux Chutes, a distance of 69 miles. The Summit level

will be through a chain of beautiful lakes connected by short stretches of canal, and will be maintained at nearly a constant level by regulating works at either end.

From the upper Lock of the Paresseux Canal down the Mattawa to its junction with the Ottawa, a distance of 14½ miles there is a fall of 137 feet which is to be taken care of with 5 locks.

From the confluence of the Mattawa and Ottawa to Fort William, about 81 miles, the river is a series of deep narrow lakes separated by rapids having an aggregate fall of 145 feet, which it is proposed to overcome by the construction of 7 locks. The Mattawa and Ottawa above Fort William have high steep banks, and can be regulated at such elevations of water surface that but little excavation will be needed except at the sites for locks and dams.

From Fort William through the Culbute and Calumet channels to the head of Lake Des Chats, (56 miles) the River falls 115 feet and will require 5 locks.

From Lake Des Chats the River falls 55 feet at the Chats Falls requiring 2 locks, with which exception the River needs but little improvement between Cheneaux Rapids and Des Chenes Rapids, a distance of 47 miles.

From Lake Deschenes to the long reach of level river below Ottawa there will be a fall of 72 feet requiring 4 locks.

In the vicinity of and below the City of Ottawa, the existing water levels will not be materially changed, except to regulate the fluctuation of water levels so as to reduce range between high and low stages of the river.

In the Grenville Canal there will be a fall of 41 feet, requiring 3 locks ; and in the Carillon Canal a fall of 20 feet, to be overcome with one lock.

At St. Annes a lock with a 3 foot lift will be required and in the Lachine Canal there will be a fall of 45 feet for which 3 locks will have to be provided.

All of the structures, for the entire route can be founded on rock in a most substantial manner, and the power necessary for operating locks, lighting and pumping, can be generated at small expense at the respective sites.

SURVEYS.

Statements of Consulting Engineer and Engineer in charge.

MR. WISNER'S STATEMENT,

Ottawa, March 7th, 1902.

The Montreal, Ottawa & Georgian Bay Canal Co., Ottawa.

Gentlemen—In compliance with your request for a statement relative to the data on which plans and estimates of cost of the proposed Montreal, Ottawa and Georgian Bay Canal have been based, I have the honor to state that there are accurate surveys covering practically the entire route, made under the direction of some of the best hydraulic engineers of this country. The fact that the earlier surveys were made by such able engineers as Mr. Walter Shanly and Mr. T. C. Clarke is a sufficient guarantee that the data is absolutely reliable. Thorough examinations have been made of the maps and records of those surveys, and so far as suitable they have been used in making plans for a waterway twenty feet deep, and where not sufficient for such purposes additional surveys and investigations have been made, so that an accurate map of the proposed waterway has been completed, and a profile constructed showing the elevations of the water surfaces of the different reaches of the canal, and the elevations of the earth and rock where excavation is necessary. In making these later surveys, some of Mr. Shanly's bench-marks were found, the elevations of which closely agreed with the earlier determinations.

From the maps and profiles of the proposed waterway the amount of earth and rock to be excavated has been computed and the cost of doing the work determined. The unit prices used are based upon the experience of some of the most successful contractors in Canada and in the

United States. The total distance from Georgian Bay to Montreal by the route is 425 miles, of which four miles are taken up with locks, forty miles of canal section 22 feet deep with a bottom width of 100 feet, 74 miles of improved river channel with a bottom width of 300 feet, and 307 miles of open lake and river, suitable for 20 foot navigation without further improvement. The cost to construct the waterway from Georgian Bay to Ste. Anne's on the St. Lawrence river has been estimated at $69,500 000, and from Ste. Anne's to Montreal at $10,500,000, making a total of $80,000.000 The cost of the section through Lake St. Louis is based upon the material to be excavated being largely of rock, and will be considerably reduced if much of the excavation is found to be of soft material.

The data upon which the plans are based have been obtained under the direction of some of the most experienced engineers in the country, and the results of their investigations published and distributed in the reports of the Department of Railways and Canals, and in the admirable papers published by the Canal Company.

In the earlier investigations of the waterway, channel depths of only from nine to twelve feet were contemplated, the requirements for which are entirely different from those for twenty-foot navigation. In the former case the natural depths of the river were ample for most of the distance between terminals and only required the necessary structures for passing rapids. To deepen these channels sufficiently for a 20 foot navigation without raising the water surfaces would be an expensive proceeding, and one which would not be considered seriously by any engineer familiar with the conditions. With the proper arrangement of locks and dams as shown upon the plans and profiles which have been prepared by the Company, the water surfaces of the river can be so raised and regulated that the total distance to be improved between Georgian Bay and Montreal will be only 118 miles, including the summit cut at Nipissing.

The raising of the water surfaces of the different reaches of the river will give the necessary depth for 20-foot navigation, at small expense compared with that necessary to excavate the channel in the river bed, and at the same time by increasing the

cross section of the river channel will diminish the velocity of the current at times of flood so as to make navigation easy and safe. In all places where excavation will be necessary in the bed of the river a bottom width of 300 feet has been used in the estimates, corresponding with the channel widths of the improved portions of the rivers in the Great Lakes system.

Anyone who has made a study of the commerce passing through the St. Mary's and Detroit rivers, can readily realize the immense amount of traffic which will unquestionably pass over the route as soon as it is completed. Since the opening of the Weitzel lock at the Soo in 1881, the traffic has doubled once every six years, and in 1901 reached the enormous volume of 28,400,000 tons. With a waterway from the upper lake cities to ocean navigation at Montreal of only about the same distance as to Buffalo, and if completed to New York by Lake Champlain and the Hudson river at least one hundred miles shorter than by any other proposed route from the lakes to that city, there can be no question that with transportation rates of less than one-tenth per ton mile of the rate necessary on railroads, the volume of traffic on the proposed waterway will exceed 8,000,000 tons annually, and gradually increase as new commerce develops.

Respectfully submitted :

GEO. Y. WISNER,
Consulting Engineer

MR. MACLEOD'S ESTIMATE.

I have examined the estimate under the supervision of Mr. Wisner, which exceeds my estimate by $7,000,000, caused principally by widening the base of excavation to 300 feet in certain places, to the substitution of steel for wooden lock gates, and the additional provisions made for regulating the flood water.

From my knowledge of the difficulties to be overcome, and knowing that there are long distances of sufficiently deep water, besides the additional depth to be gained by raising the waters as proposed, I consider that Mr. Wisner's estimate is sufficient.

The length of the canal, according to Mr. Clarke's report is 430 miles, which has been considerably shortened, as a result of recent surveys.

HENRY A. F. MACLEOD,
M. Inst. C. E.,
Engineer in Charge.

Professional Record of Mr. Geo. Y. Wisner, Civil Engineer of Detroit, Mich., Consulting Engineer of the Company.

Mr. Wisner graduated as a civil engineer from the University of Michigan in 1865, where, during his senior year in the university, he was honored by being appointed assistant professor in engineering.

From 1865 to 1880 (15 years) he was connected with the government surveys and investigations on the Great Lakes and the Mississippi River with reference to the making of charts of these waterways, and the designing of plans for the improvement of harbor and channels.

From 1880 to date he has been engaged in the private practice of his profession, together with the duties arising from his appointments as member and otherwise, on various government commissions. Among other important works of which he has had charge are :

The surveys and investigations with reference to the enlargement of the Illinois and Michigan canal, with report on plans and estimates.

Surveys, examination and report upon the proposed improvement of the Des Plaines and Illinois rivers, involving many of the problems common to the Ottawa waterway.

Surveys and investigations of the Mississippi river between Memphis, Tenn. and Greenville, Miss., with reference to plans for the improvement of the low wate channel of the river.

Superintendent of construction of the 10th and 11th districts of the United States light house department.

Chief engineer of the South Pass jetty work at the mouth of the Mississippi river, where he rebuilt the celebrated jetty works originally constructed by Capt. James B. Eads.

Chief engineer in charge of the construction of the harbor works at the mouth of the Brazos river, Texas, where a harbor entrance 20 feet depth was opened after the United States government engineers had abandoned the improvement as impracticable.

Consulting engineer for the Aransos Pass Harbor company, at Aransos Pass, Texas.

Author of movement for the improvement of lake channels by regulating level of the Great Lakes, and after appointment on Deep Waterway Commission inves igated and reported on plans and estimates for improving lake channels by regulat ing the levels:

54th Congress, 1st Session, House of Representatives, Report No. 245
Surveys of certain outlets on the Great Lakes.

REPORT.

"The raising and conserving of the water level of the Great lakes is a matter of vast importance, indeed of vital necessity, to the internal commerce of the nation. The plan for accomplishing this, above suggested, has the support of very distinguished engineers; and in view of the magnitude of the interests involved, your committee would respectfully recommend that the resolution be favorably reported.

"The committee having also considered the papers on this general subject submitted by George Y. Wisner, civil engineer, of Detroit, and Thomas T. Johnson, civil engineer, of Chicago, before the International Deep Waterways Association at its convention in Cleveland, in September last, deem them to be of such great value for the information and suggestions they contain that they are incorporated in this report."

Member of the United States Board of Engineers on Deep Waterways, 1897-1900, appointed by President McKinley to investigate and report upon route and plans and cost for a deep waterway from the lakes to the Atlantic. This investigation involved the solution of engineering problems much more difficult than anything to be encountered in the proposed Montreal, Ottawa & Georgian Bay water way. The field and office work of the investigation was under Mr. Wisner's personal supervision, and the exhaustive report on the work recently published by the United States government is largely the results of Mr. Wisner's labor and writings.

He was expert engineer witness on law suits arising from the construction of the great sanitary canal at Chicago, and arbitrator appointed by the High Court of Justice of Ontario, to adjust the claims and damages between the water commissioners of the city of London, Ont., and the owner of the water rights affected by back water from the waterworks dam at London.

Member of commission of expert engineers appointed by the city of St. Louis, Mo., to report on plans and estimates for obtaining a pure and wholesome supply of water for that city, involving works which will cost over $30,000,000.

Mr. Wisner has been a member of the American Society of Civil Engineers for 26 years, and for a number of years was a member of the board of directors of the society.

Mr. Wisner is the author of numerous papers and reports on important engineering projects, which have been published in the transactions of the American Society of Civil Engineers' committees and of the engineer department at Washington.

Professional Record of Mr. Henry A. F. MacLeod, M. Inst. C. E., Ottawa, Engineer in Charge.

Mr. MacLeod was educated at Upper Canada College. From 1851 to 1854 he was engaged in the practice of his profession at Kingston, Ont., and was afterwards connected with the exploration and construction of the principal railways of Canada —the Grand Trunk and others, 1851-59; the Intercolonial, 1867-73, and the Canadian Pacific railway, 1873-92.

He made an exploration for the Canadian Pacific railway from the mouth of the Skeena River, B. C., through the Peace River country to Winnipeg, 1879, and had charge of one of the heaviest sections of the railway in the mountains of British Columbia.

He had made in the previous year (1878) an examination for the winter crossing of the Straits of Northumberland, and railways to connect the Intercolonial with the Prince Edward Island railway.

He has been employed on important arbitrations, and in May, 1893, was appointed chairman of the Lachine commission of investigation.

His several official reports upon the Northwest territories, the Peace River country and the northern portion of British Columbia contain much valuable information, touching the resources and capabilities of most portions of the Dominion, to be found nowhere else.

He commenced surveys for the Montreal, Ottawa and Georgian Bay Canal Company, of the Summit section of the Georgian Bay canal, in July, 1899. This comprises the portion of the route from Lake Nipissing to Talon Lake. The report was published in 1900.

In November, 1899, he began surveys for the Department of Railways and Canals, of the Ottawa River, from the lock at Ste. Anne's to Lake Deschenes, 8 miles above the city of Ottawa, not including the Grenville and Carillon canals. The report is published in the annual report of railways and canals for 1899-1900.

He made an estimate of the approximate cost of the whole canal for 14-foot navigation, taking the plans and reports of Messrs. Shanly and Clarke, made in 1857 and 1860, and information recently obtained, as the basis for computation.

In September, 1900, he continued the Ottawa river surveys, the part examined being the Rocher Fendu and Calumet, also the Culbute and Allumette channels. This report is published in the annual report of 1900-1901.

He also made an estimate for 20-foot navigation for the whole canal in 1901. This estimate, with that for 14-foot navigation, is published in the annual report for 1900-1901.

In July, 1901, he accompanied Mr. George Y. Wisner, consulting engineer, and Mr. H. A. Purdon, M. Inst. C. E., on an examination of the French River, also the Summit section, and the Mattawan River.

Mr. MacLeod is a member of the Institution of Civil Engineers, London, and of the Canadian Society of Civil Engineers.

Professional Record of Henry Carre, M. Can. Soc. C. E.

Engaged on re-location of the Grand Trunk Railway between St. Marys and Sarnia, also on the location of the Kingston Branch.

Asst. Engineer on the Arthabasca and Three Rivers Branch, and leveller on the Grand Piles Railway location.

In charge of party located line through the Cobequid Mountains, Nova Scotia, for the Intercolonial Railway.

In charge of party on exploratory Surveys, and located line as adopted between St. Fabien and the Amqui River.

In 1870—Resident Engineer on the construction of contract 14, Intercolonial Railway, at Lake Metapedia.

For the next ten years with the Canadian Pacific Railway:—Made exploratory surveys at Lake Nipegon and between Thunder Bay and the English River. Located line between Rat Portage and the Narrows of Lake Manitoba. Resident Engineer on construction of Section 15, between Rat Portage and Cross Lake.

In 1888—designed and constructed large flume at Trenton to control one half of the power of the River Trent.

In 1899 joined the staff of the Montreal, Ottawa and Georgian Bay Canal Surveys, and in charge of party, located line through the Summit cut and Trout Lake to the foot of Turtle Lake, 19 miles. Also between Black Falls and Portage du Fort on the Rocher Fendu Line and between Bryson and the main River on the Calumet Channel. Also between the City of Ottawa and Deschenes Lake and made survey on the ice from Ottawa to Montebello.

Professional Record of H. G. Stanton M. Can. Soc. C. E.

Employed on the Montreal & Occidental Railway.

Employed on the Ste. Anne Lock and Canal contract as Assistant Engineer.

Employed on the contract for deepening the channel at Ste. Anne.

In 1888 he joined the Grand Trunk Railway as Engineer, having charge of 30 miles of double track work, which he finished, and then had charge of the construction of part of the Cobourg, Peterboro & Marmora Railway for the Grand Trunk Ry.

Entered the employment of the Department of Railways & Canals, having charge of a breakwater at Ste. Anne; and afterwards at Grenville in charge of rebuilding of approaches there.

In charge of the enlargement of two sections of the Grenville Canal, remaining there for about two years, when he joined the staff of the, Montreal, Ottawa & Georgian Bay Canal Surveys.

Was employed for some months on surveys of drowned lands on the Upper Ottawa River for the Department of Railways & Canals.

At present in charge, as resident Engineer for the Renfrew Power Company, constructing a dam, flume and power house.

Quantities both wet and dry have been taken out for every foot of the distance from the mouth of French River to Montreal under the direction and careful supervision of Henry A. Purdon, Esq., who has been engaged in this branch of professional work for years and is specially qualified to perform same.

Professional Record of H. A. Purdon, M. Inst. C. E.

Resident Engineer in charge of construction of division of Hull & Barnsley Ry., England.

Resident Engineer at Granada, constructed division of Great Southern Railway of Spain. General Manager from 1895 to 1897 of Eastern portion of the same Railway.

For the last five years engaged in preparing plans for English Parliament and in investigations and reports on the following important Foreign undertakings:

Reported and estimated on the construction of 800 miles of Railway in Russia proposed by the Russian Government; also upon an important projected railway tunnel desired by the Government of Roumania.

In 1899 and 1900 twice visited Buda-Pesth to examine and report upon the projected new Port there, put forward by the Hungarian Government for the improvement of the large River traffic on the Danube. At the same time, he examined extensive canal and drainage schemes in Hungary.

Later in 1900, visited Malta to estimate the cost of the two Naval Docks to be constructed there, and in 1901 reported upon the progress of the Graving Dock which Messers C. H. Walker & Co., Ltd., are carrying out at Alexandria, Egypt.

In May 1901, was in Canada compiling the plans and sections for the projected Montreal, Ottawa, & Georgian Bay Canal.

NATURAL ADVANTAGES.

Permanency of Water Supply.

The Ottawa River Navigation is assured of permanency of water supply, and has therefore no problem to confront similar to the serious one raised with regard to the St. Lawrence by the gradual lowering of the Great Lake levels for a number of years past. Records of the highest and lowest water have been kept since the building of the Rideau Canal and show *no appreciable diminution in the volume of the Ottawa waters for the last seventy years.*

The average lowest water depths on the lower sill of the lower lock of the Rideau Canal at Ottawa for periods of five years from 1873 have been as follows:

Average lowest water	1873-1877	6ft.	2 in.
" " "	1878-1882	6ft.	6 in.
" " "	1883-1887	6ft.	10 in.
" " "	1888-1892	6ft.	10 in.
" " "	1893-1897	6ft.	7 in.
" " "	1898-1902	7ft.	2 in.
Lowest water	1898	7ft.	11 in.
" "	1899	6ft.	11 in.
" "	1900	8ft.	7 in.

For several reasons no measurable loss of volume of water is likely to occur :—

The great number and extensive combined area and volume of the lakes of the Ottawa Valley constitute them *the most perfect possible system of natural reservoirs* for regulating and restraining the flow of flood water.

The opening of spring coming later and the commencement of cold weather in autumn coming on sooner on the headwaters of the river than on its lower stretches tends to retard the flood waters, to lessen the velocity of the currents in spring, to lessen the height of flood water and to promote uniformity of discharge of the stream. Something of the extent of this influence may be judged by comparison of the southern tributaries of the Ottawa, with those coming in from the north.

The methods of lumbering operations practised under the policy of the Ontario and Quebec Governments lead to the removal of the larger trees only. The smaller and second growth of timber are growing up and keep the country covered.

The pine with which the country was originally covered, has been largely removed and its place taken by second growth spruce and hardwoods in which the danger from fire is much less.

Large forest reserves have been created on the headwaters of tributaries of the Ottawa, and the character of extensive areas of the drainage basin of the river is such that they will probably be withheld from settlement and maintained permanently under forest.

Should the water level, notwithstanding the operation of these causes, tend to become permanently lower *it would not materially effect the navigation in any way since arbitary levels can be maintained by means of dams. and the volume of water is enormously in excess of any possible requirements for purposes of navigation.*

Finally, in case necessity should arise *both the volume and the level of low water in the Ottawa could be cheaply aud effectively regulated by utilizing as artificial reservoirs some of the numerous lake basins* referred to, improving these as required, a course which has from time to time been successfully adopted to regulate the flow of almost every tributary of the Ottawa River by the lumbermen of the district for the purpose of driving their logs.

Physical Features.

It is an important geological fact that the outlet of Lakes Superior, Michigan and Huron was for thousands of years by the Georgian Bay through the valley of the present Ottawa River, and that the completion of a deep-water channel along this route is merely in the direction of restoration of former natural conditions. An immense volume of water has in the past carved out the softer portions of the river channels, in the French, Mattawa and Ottawa Rivers often to immense depths. Thus the course of the waterway is, for the most part, practically a series of deep lakes separated by bars of rock at which

cascades occur. These lakes, or lakelike expansions, afford a natural navigation of the highest class over the larger proportion of the route. The concentration of the descent in rapids or cascades in a series of steps with long intervening level stretches, minimizes the amount of canalling to be done, as in many cases no more than a simple lock is required.

Added to this, over a great portion of the route the banks are bold and rocky, often precipitous, and the conditions every way favourable to the raising of existing water-levels by means of dams and the deepening of the channel thereby without having recourse to excavation.

The existence of alternative channels at most of the large rapids on the Ottawa River will be of service in the execution of works to be constructed, and will be of importance in the regulation of the waters for navigation, and the preservation of structures during flood.

Conditions dependent upon the state of settlement of the country are also most favourable. The present location of railways will permit supplies, material, stone for locks, cement, machinery, plant, etc. to be deposited within a short distance of any point on the whole route, and will not only lessen the cost of transportation, but will permit work to be carried on along the whole route simultaneously. The use of powerful explosives, and the most modern appliances in dredging, excavating, and construction machinery will lead to great savings in cost as compared with the methods in vogue at the time estimates of cost were made some years ago, and will offset to some extent the added cost of the larger scale of navigation.

The need of the Ottawa waterway both as a through route, and for the development of local resources is vastly greater than ever before. The marvellous growth of the Western States and our own Northwest in the last quarter of a century and the consequent increase of commerce on the Great Lakes, have given rise to a freight traffic between the Great Lakes and the sea-board, already of enormous extent and rapidly increasing, such as must in the near future tax all possible means of transportation, and in the conveyance of which the Ottawa River

route, owing to its superiority in point of shortness, cheapness, and safety must play a very important part.

The vacant lands of the United States are now practically exhausted, and the tide of population has turned towards the almost limitless wheat areas of the Canadian Northwest. Settlers are rapidly flocking into that country, and both its output of agricultural products and its requirements of manufactured goods will increase with great rapidity in the near future. It is for Eastern Canada to furnish transportation facilities for the former and to reap the benefit of the latter in extension of industries. Failure to realize and meet the needs of the Northwest for cheap and adequate transportation can only result in the bulk of its exports going forward via United States routes, and in its imports being almost wholly supplied from the States to its south, a result not only subversive of the commercial interests of Eastern Canada but destructive of community of interests between the various portions of the Dominion, and therefore prejudicial to our national welfare.

It has been stated that the Northwest is capable of sustaining a population of at least 50,000,000. Last year in Manitoba 400,000 people raised 108,000,000 bushels of grain. Extensive car famines have already occurred,and the railways have proved inadequate to the task of moving existing wheat raised by a comparatively small population. With the growth of population and greatly increased production the difficulties must be intensely aggravated unless outlets of ample capacity are provided.

Some indication of the relation of existing routes to the traffic potentialities of the great lakes may be gathered from the fact that the volume of the grain business over the Ottawa and Parry Sound Railway last year, drawn from both Lake Michigan and Lake Superior, was about *one-sixtieth* of the amount of the actual traffic through the Sault Canals last year and that the traffic at the Sault has for some time past doubled about every six years.

The saving to be effected by the deep waterway in the cost of transportation will directly benefit the producers of the

Northwest will stimulate immigration into that portion of the Dominion and be of incalculable value in the development of its resources.

Large portions of the Ottawa valley, and of Northern Ontario and Quebec possess valuable mineral and other resources as well as spruce and other timber in great commercial demand at the present time. For the purpose of stimulating and making more remunerative the lumber and mining industries in these districts, and of aiding and promoting the construction of railways to open up northward, no work could be undertaken comparable in importance with the canalization of the Ottawa River.

The industrial future of Canada depends largely upon the working of its extensive deposits of iron. As the deep channel at the Sault has resulted in an output of 125,000,000 tons of ore from the American shores of Lake Superior in the last 17 years the Ottawa Waterway will lead to an enormous increase in the iron raised in this part of Canada, and will be of great importance in bringing it alongside the coal of Nova Scotia.

Nova Scotia coal has hitherto not ascended the St. Lawrence to any extent above Montreal, to which point the shipments amount to 700,000 tons. The expense and loss incident to trans-shipment and the competition of American coal have prevented any further extension of the market for Canadian coal in this direction. A glance at the map however will shew that the Ottawa Waterway will give Canadian coal a great advantage in competing with American coal. All the Lake Huron and Georgian Bay ports are closer to Montreal by four hundred miles by the Ottawa than by the St. Lawrence. The portion of Ontario stretching all the way from the Quebec boundary to the Manitoba boundary, including the richest mineral district of the province, will be served by the canal. Going up the St. Lawrence, Canadian coal directly meets the American competition. Every mile travelled west is a mile into the territory of American coal shippers, but a journey of 400 miles up the Ottawa brings the coal carrier within a few miles of Sudbury to the edge of possibly the greatest mineral area in Eastern Canada, and 200 miles more brings him to the "Soo." There

is also no reason why grain should not be taken from Fort William to Sydney. It could be stored there and shipped all the year round; would be a thousand miles closer to Liverpool than it would be at New York, and the vessel could be sure of a return freight of coal.

The opening of the Ottawa navigation as a through waterway is not only a commercial necessity but a measure of National and Imperial Importance.

Of *military importance* as the only possible waterway between the Great Lakes and the Atlantic entirely within Canadian territory.

Of *national consequence* as furnishing an additional bond and means of communication between widely removed portions of the Dominion, carrying farther northward the line of settlement, and of profitable commercial and industrial operations and thus tending to add compactness to our territory and to cement together more firmly its parts.

And of *Imperial value* as part of the transcontinental transportation system, a link in the shortest possible highway between the granary of the Northwest and the British market.